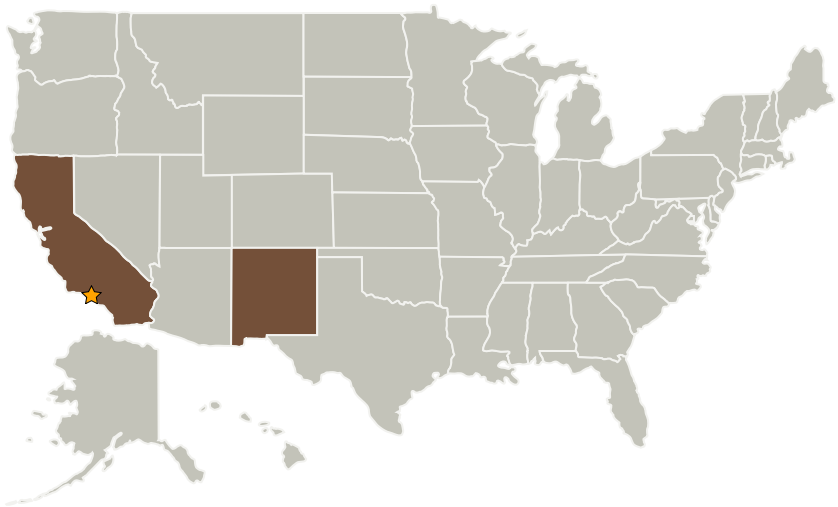
High-Bandwidth Hybrid Sensor (HYSENS), Phase II

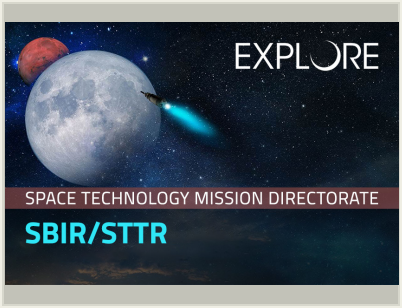
Completed Technology Project (2006 - 2008)

Project Introduction

ATA has demonstrated the primary innovation of combining a precision MEMS gyro (BAE SiRRS01) with a high bandwidth angular rate sensor, ATA's ARS-14 resulting in a low-noise, high bandwidth hybrid sensor, or HYSENS in a Phase I SBIR. The primary emphasis in Phase I development was the implementation and real-time demonstration of the sensor fusion algorithms that combined the output from a MEMS gyro and the ARS-14 resulting in a HYSENS that exhibits a bandwidth of DC to 2000 Hz and NEA of less than 0.1 ☐rad rms (0.5-2000 Hz integration bandwidth), thus meeting the requirement specified in the SBIR SOW. The HYSENS has first applicability in optical Inertial Reference units for used in Free Space Laser Communication. The HYSENS-based IRU, or HIRU, that is proposed for the Phase II effort will result in the state of the art in compact optical IRUs. The significance of the HIRU innovation is that the HIRU will escalate the state-of-the-art in small, precision optical IRUs by virtue of minimal mechanical envelope, low mass, high performance, both in jitter mitigation and Inertial Attitude Knowledge (IAK), and power dissipation. In addition, the HYSENS was designed from the onset to be highly modular and flexible by virtue of the sensor fusion algorithms and computational architecture to allow rapid integration of higher performance MEMS gyros into future versions of the HYSENS.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	New Mexico

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.2 Navigation Technologies
    - TX17.2.3 Navigation Sensors